

MISSION SAHARIENNE AUGIÉRAS-DRAPER, 1927-1928.

PARASITIC NEMATODES,

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The following report deals with a collection of Nematodes made by the « Mission Saharienne Augiéras-Draper », an expedition to the Central Sahara and Niger valley organized by the Société de Géographie in 1927. For the privilege of studying this interesting material my best thanks are due to M. G. Grandidier, General Secretary of the Société de Géographie, and to M. Th. Monod, of the Muséum d'Histoire naturelle, who was a member of the expedition. I also wish to thank M. R.-Ph. Dollfus for his kindness in obtaining for me additional information as to the localities in which the material was collected.

The collection includes three species which appear to be new to science. Co-types of these will be deposited in the Muséum national d'Histoire naturelle, Paris, and also, by the kindness of the Société de Géographie, in the British Museum (Natural History), London.

Fam. **ASCARIDÆ.**

Subfam. **Anisakinæ.**

**PORROCÆCUM ANGUSTICOLLE** (Molin, 1860).

A damaged specimen (anterior portion only) from the intestine of a vulture, taken on the Niger near Bamako, 22, ii. 1928.

**PORROCÆCUM RETICULATUM** (v. Linstow, 1899).

A single female, in damaged condition, from the intestine of a heron, taken on the Niger near Lake Débo, 7. ii. 1928.

**CONTRACÆCUM SPICULIGERUM** (Rud., 1908).

Several specimens from the stomach of *Phalacrocorax africanus*, taken on the Niger near Lake Débo, 3. ii. 1928. The spicules of the

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males are rather short, but the specimens are probably not fully grown.

CONTRACÆCUM sp.

Larval forms from the peritoneum of *Clarias lazera* (Bourem, R. Niger, 6. i. 1928) and *Hydrocyon* sp. (R. Niger, between L. Débo and Kabara, 1. ii. 1928). These are large, encapsuled larvæ, with very slender œsophagus, short œsophageal appendix and long and very wide intestinal cæcum. The specimens from both hosts probably belong to the same species. Three larvæ from the peritoneum of *Hydrocyon brevis* (R. Niger, near L. Débo, 7. ii. 1928), measuring 30-35 mm. in length, and having a long intestinal cæcum and very short œsophageal appendix, may again be of the same species. Two larval *Contracæcum*, in poor condition, were also taken from the stomach of an egret near L. Débo, 5. ii. 1928.

Fam. **HETERAKIDÆ.**

Subfam. **Heterakinæ.**

**HETERAKIS BREVISPICULUM** Gendre, 1911.

A number of specimens of this species, together with *Subutura* and *Numidica* (see below) were taken from the cæca of *Numida* sp. near Bamako, on the Niger, 22. ii. 1928.

Subfam. **Subulurinæ.**

**SUBULURA SUCTORIA** (Molin, 1860).

This species occurred in the cæca and intestine of *Numida* sp. near Bamako, R. Niger, 22. ii. 1928.

**NUMIDICA BOUETI** (Gendre, 1911).

Syn. *Heterakis boueti* Gendre, 1911.

*Subutura boueti* (Gendre) Travassos, 1913.

*Oxynema boueti* (Gendre) Railliet et Henry, 1914.

A few specimens of this species occurred in the intestine of *Euxerus erythropus* at Niafunké, below Lake Débo, R. Niger, 2. ii. 1928.

As has been pointed out by the writer (1928) and by Gendre (in Joyeux, Gendre et Baer, 1928), this species possesses two spicules, and not a single spicule as stated in the original description. Gendre, in his redescription, gives the length of the right spicule as 0.86-1 mm., and that of the imperfectly-chitinized left spicule as 0.62-0.68 mm. The accessory piece is, according to

Gendre, 0.27-0.29 mm. long. From one of the males in the present collection the writer obtained the following measurements : right spicule 0.73 mm.; left spicule 0.6 mm.; accessory piece 0.22 mm.

In the present specimens the sucker of the males is lined with interrupted, longitudinal cuticular ridges, and there is a cushion-like swelling of the posterior lip of the cloaca, covered with small granulations, exactly as in the genotype, *Numidica numidica* (Séurat, 1915).

The species was originally recorded from *Euxerus* [*Xerus*] *erythropus* in Dahomey. It has also been recorded by Gendre (1928) from *Sciurus annulatus*, in the same locality, and by the present writer (1928) from *Lophuromys sikapusi* and *Praomys tullbergi* in Nigeria.

***Numidica monodi*, sp. n.**

(Figs. 1-3).

This species occurred in considerable numbers in the cæca of

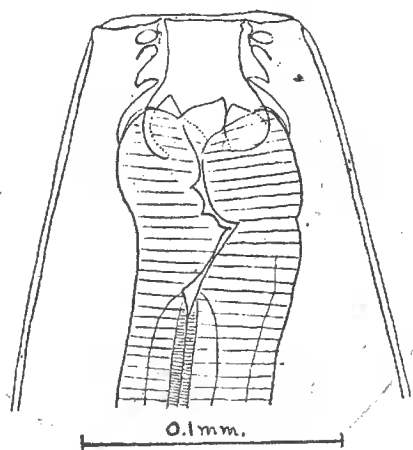


Fig. 1. — *Numidica monodi* nov. sp. ♀ ventral. Cam. T. D. 2.

*Numida* sp. near Bamako, on the Niger, 22. ii. 1928, together with *Subulura suctoria* and *Heterakis brevispiculum*.

The specimens are somewhat contracte, so that the measurements of length should probably be increased somewhat. The males measure 4.25-5.9 mm. in length, the females 4.4-7.3 mm. The maximum thickness, in the male, is 0.28-0.35 mm.; in the female (excluding the vulvar prominence), 0.35-0.44 mm. The cuticular striations are very fine (about 0.002 mm.). There are no lateral alæ. The distance from the anterior extremity to the posterior end of the oesophagus (including the bulb) is 0.8-0.9 mm. in the male, 0.9-1.15 mm. in the female. (Owing to contraction, which has

usually caused the œsophagus to be bent in several places, these measurements should be somewhat greater). The buccal capsule is divided transversely into two portions, which together measure 0.05-0.055 mm. in length. The posterior portion contains three large teeth. The œsophageal bulb has a transverse diameter of 0.2-0.26 mm., and is separated by a very narrow « neck » from the swollen posterior end of the œsophagus proper. The nerve-ring is

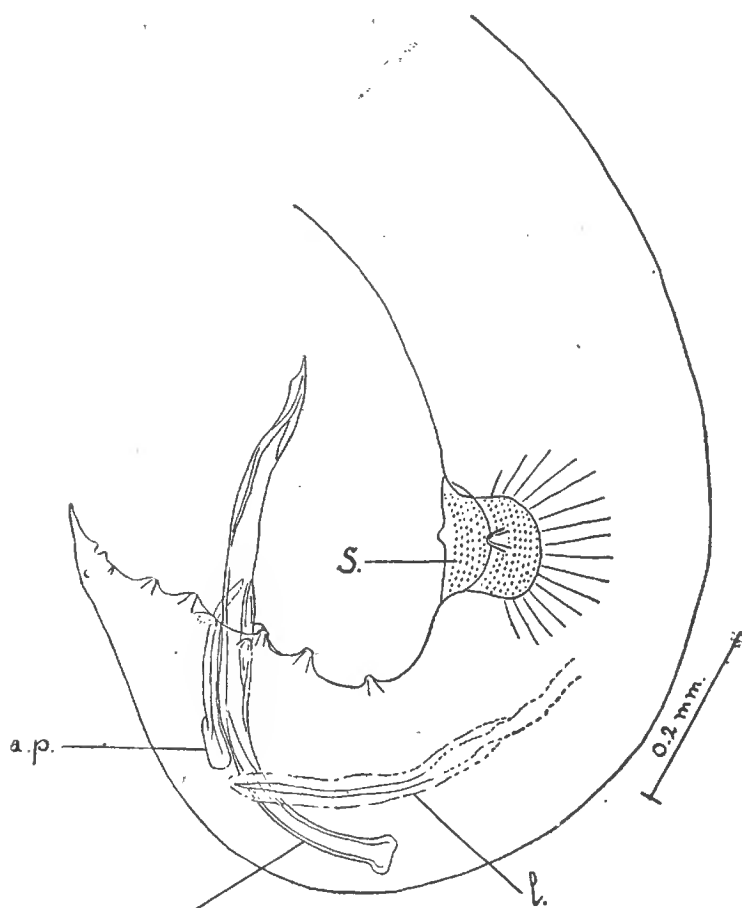


Fig. 2. — *Numidica monodi*, nov. sp. ♂ latéral. Cam. T. A. 4.

situated at about 0.23 mm., and the excretory pore at about 0.32 mm., from the anterior extremity.

The posterior end of the male is curved ventrally. The tail is sharply conical and measures 0.2-0.21 mm. in length. There are eleven pairs of caudal papillæ, of which six are postanal. As in *N. numidica* (Seurat, 1915) and in *N. boueli* (Gendre, 1911), the posterior lip of the cloacal aperture is raised into a cushion-like structure covered with small granulations. The sucker is also bordered by a number of interrupted, longitudinal cuticular ridges. The two spicules are markedly unequal and dissimilar. The right

spicule is well-developed and fully chitinized, and is provided with folded alæ for about the distal two-thirds of its length. It measures 0.525-0.61 mm. in length. The left spicule is much less well developed and very imperfectly chitinized, especially towards its base. It is about 0.3-0.36 mm. long. The accessory piece is 0.17-0.2 mm. long, and is pointed and narrow, except for a basal expansion.

The tail of the female is about 0.5 mm. long and is conically tapering. It is without a sudden narrowing near the tip, such as

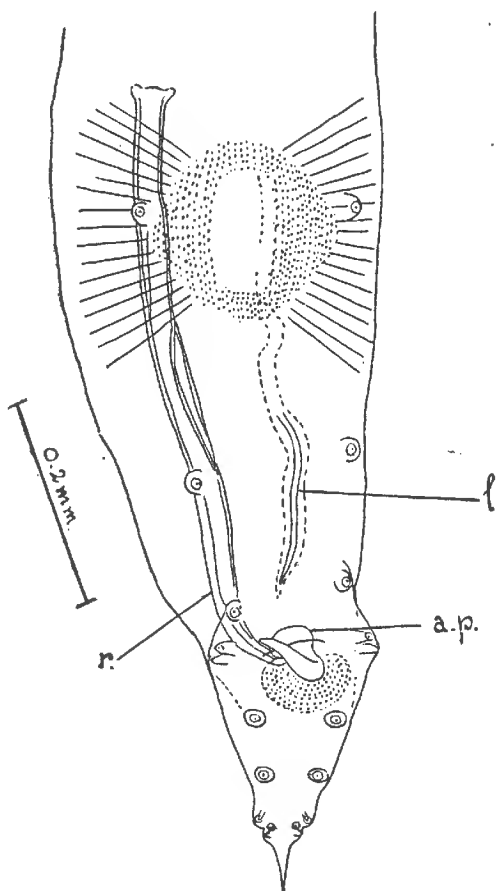


Fig. 3. — *Numidica monodi*, nov. sp. ♀ ventr. Cam. T. A. 4.

is present in *Subulura suctoria*, where the tail ends in a short, slender spike. There is a pair of caudal papillæ, situated at about 0.2 mm. from the tip of the tail. The vulva is very prominent, and is situated a little in front of the middle of the body (at 2.1-3.3 mm. from the anterior end). The vagina runs anteriorly from it. The eggs are roundish-oval or subglobular and measure 0.075-0.093 mm. in maximum diameter. When ready for laying, they contain vermiform embryos.

Note on **Numidica**, **Oxynema** and **Subulura**.

The two species to which reference has just been made are placed in the genus *Numidica* Barreto, 1919, on account of their close resemblance to the only species hitherto ascribed to that genus, viz. *N. numidica* (Seurat, 1915), from the Algerian fox, *Vulpes vulpes atlantica*. From this form both species differ only in details of measurements. It should be noted, however, that the distinctions between *Numidica* and *Oxynema* v. Linstow, 1899, and also between these two genera and *Subulura* Molin, 1860, are not great. Gendre (1928) would refer both *N. numidica* and *N. boueli* to *Oxynema*. The genotype of *Oxynema*, *O. crassispiculum* (Sonsino, 1889), which, like *N. numidica*, is a parasite of foxes, was described by both Sonsino (1889) and v. Linstow (1899 : *Oxynema rectum*) as having two spicules, of which one was very much longer than the other. It is probable, however, that the short spicule referred to was really the accessory piece, and it is therefore uncertain whether there is a second, possibly imperfectly-chitinized, spicule or not. Should this be present, the supposed generic distinction between *Oxynema* and *Numidica* would probably break down. At the same time, although typical species of *Subulura* possess two equal spicules, a considerable number of forms, chiefly from birds, generally ascribed to that genus have unequal spicules, so that it is questionable whether a generic distinction between *Numidica* and *Subulura* is entirely justifiable.

Fam. **QUIMPERIIDÆ**, nov.

**Gendria tilapiæ** n. g., sp. n.

(Figs. 4-6.).

This curious form was collected from a fish, *Tilapia galilæa*, taken in the Niger, between Lake Débo and Bamako, 14.ii. 1928.

The male measures 7-9 mm. in length, and the female 7.7-11.5 mm. The maximum thickness varies between 0.22 and 0.35 mm. The body tapers towards both ends, but anteriorly there is an oval inflation of the cuticle. The cuticle appears smooth. The musculature is apparently « meromyarian ». The mouth is surrounded by two lateral and four submedian papillæ, and forms a slight depression at the base of which, projecting from the entrance to the œsophagus, there are three conical teeth — a large dorsal tooth and two smaller subventral teeth. The œsophagus is muscular throughout, relatively very short, and somewhat club-shaped both anteriorly and posteriorly. It measures 0.34-0.5 mm. in length.

At its junction, with the intestine there are three valves. At about its middle it is surrounded by the nerve-ring. The excretory pore is situated a little behind the posterior end of the œsophagus, at 0.55-0.6 mm. from the anterior extremity. At about the same level, or a little further forward, there is a pair of rather prominent cervical papillæ.

The tail is tapering and sharply pointed in both sexes. In the

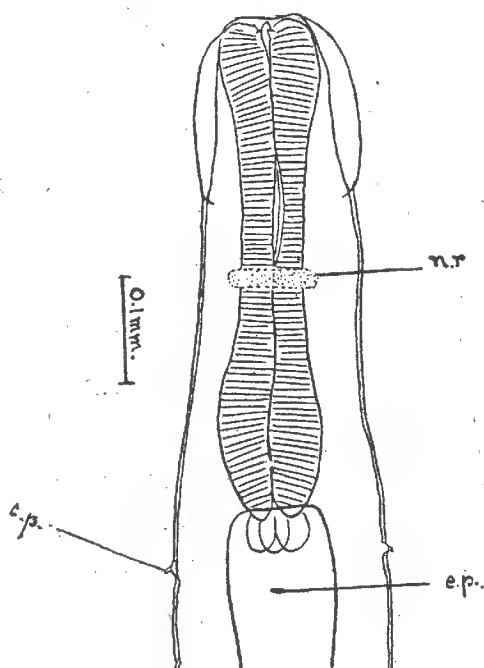


Fig. 4. — *Gendria tilapia*, ♀ ventral, from *Tilapia galilæa*. Cam. T. A. 4.

male it measures 0.32-0.37 mm. in length. There are very slight caudal alæ, beginning a little in front of the cloaca and ending before the tip of the tail. There are twelve pairs of papillæ, of which five are small and postanal (two of these being more laterally situated than the others) and seven larger and preanal. Between the fifth and sixth pairs in front of the cloaca there is a sucker-like organ similar to those found in the Cucullanidæ, Kathlaniidæ and other groups. The spicules are sickle-shaped and equal, measuring 0.41-0.49 mm. in length, and have the « sheathed » appearance characteristic of those of certain Kathlaniidæ. There is a small accessory piece.

In the female the tail is 0.4-0.46 mm. long. The vulva is situated a little behind the middle of the body (at 3.2-5 mm. from the posterior end). Its lips are rather prominent. There is a short muscular vagina, which runs anteriorly from the vulva. The two uterine branches are opposed, and contain nearly spherical eggs measuring 0.06-0.067 mm. in diameter and with unsegmented contents.

The affinities of this species are difficult to determine. Its characters suggest relationship either to the Kathlaniidæ or to the Cucullanidæ, but the simple structure of the œsophagus forbids its inclusion in either of these families. On the whole, it seems to approach more nearly to the former group, since the mouth, though very simple in structure, appears to be formed on a trira-

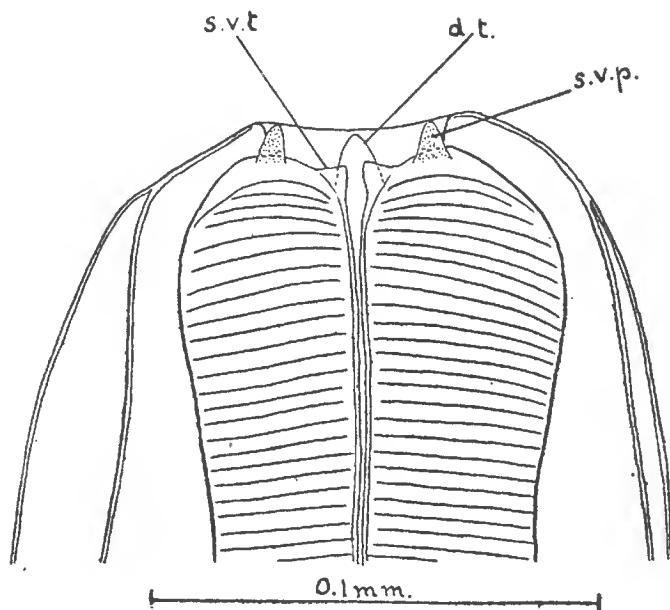


Fig. 5. — *Gendria tilapia*, ♀ ventral. from *Tilapia galilæa*, Cam. T. D. 4.

diate plan, as is shown by the presence of the three teeth at its base.

A form described by Gendre (1926) under the name of *Quimperia lanceolata*, shows considerable resemblances to the species under discussion. *Quimperia* has, according to Gendre's description, three small lips, one dorsal and two subventral. The œsophagus is muscular throughout, and though showing a division into two portions of different calibre, has no bulb. There is a preanal sucker-like organ in the male, and the spicules are equal. There is a pair of wide cervical alæ, instead of the cephalic inflation found in the present species.

It seems impossible to refer the form here described to the genus *Quimperia*, but they are almost certainly very closely related. Gendre, in his original description, left the systematic position of *Quimperia* undecided. He has subsequently (*in* Joyeux, Gendre et Bare, 1928) erected for it a subfamily Quimperinæ, which he places in the family Heterakidæ. The writer is unable to accept this arrangement, since the meromyarian musculature and the absence of an œsophageal bulb make it very questionable whether *Quimperia* ought to be included in the Heterakidæ.

A new family Quimperiidæ is therefore proposed to replace Gendre's subfamily and to include *Quimperia* and the new genus *Gendria*, which is named in honour of Dr. Gendre. This family may for the present be regarded as forming part of the order As-

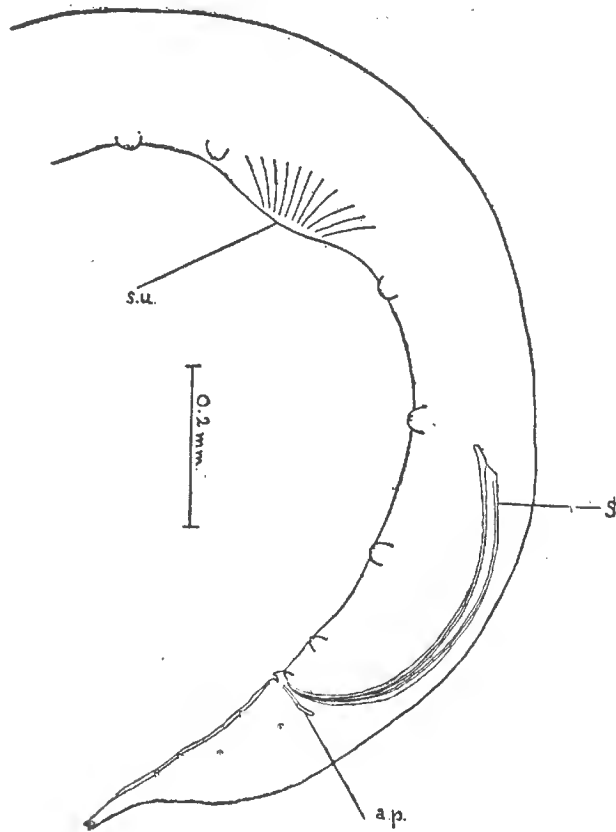


Fig. 6. — *Gendria tilapæi*, ♂ latéral, from *Tilapia galilæa*, Cam. T. A. 4.

caroidea (*sensu* Baylis and Daubney, 1926), and occupying a position near the Kathlaniidæ. The family and the two genera may be provisionally defined as follows.

Fam. **QUIMPERIIDÆ** nov.

Ascaroidea. Meromyarian. Lips small or absent. Buccal capsule absent. Œsophagus muscular throughout, without pharynx or distinct bulb. A preanal sucker, without chitinoid border, present in the male. Spicules paired, equal. Vulva in posterior half of body. Uterine branches opposed. Oviparous.

**QUIMPERIA** Gendre, 1926.

Quimperiidæ. Mouth bordered by three simple lips. Œsophagus composed of a shorter and narrower anterior portion and a longer

and wider posterior portion, both cylindrical. Wide lateral cervical alæ present.

Genotype : *Q. lanceolata* Gendre, 1926, from an acanthopterygian fish.

**Gendria**, n. g.

Quimperiidæ. Mouth a shallow depression without definite lips, but with a dorsal and two subventral teeth at its base. Œsophagus not divided into two portions, but somewhat club-shaped both anteriorly and posteriorly. Cervical alæ absent, but cuticle inflated anteriorly to form an oval expansion. An accessory piece present in the male.

Genotype : *G. tilapiæ* sp. n., from *Tilapia galilæa*.

Fam. **OXURIDÆ**.

Subfam. **Oxyrinæ**.

**Thelandros sahariensis** sp. n.

(Figs. 7-8).

A number of specimens occurred in the intestine of *Uromastix* sp. in the Hoggar region, Central Sahara, 4. xi. 1927, together with *Tachygonetria vivipara*, which were at first thought to belong to the form common in *Uromastix* in North Africa, viz. *Thelandros alatus* Wedl, 1862. On closer examination, however, it was found impossible to identify them with that species. They resemble more closely *T. micruris* Rauther, 1918, a form recorded from an Indian species of *Uromastix* (*U. hardwickii*). Although Rauther (1918) gives very few measurements of his species <sup>(1)</sup>, these show sufficient differences to make it very questionable whether the present material can be ascribed to *T. micruris*. Galeb (1889) gives no measurements whatever of « *Oxyrus uromasticolla* », which Seurat, probably rightly, assumes to be a synonym of *Thelandros alatus*. Incidentally it may be mentioned that Thapar (1925) has described material from *Uromastix hardwickii* under the name of *T. alatus*. The host being the same, it seems possible that Thapar's material belonged, in reality, to *T. micruris*.

In the present material the males measures 2. 2-2.43 mm. in length and 0.3-0.34 mm. in maximum thickness; the females

<sup>(1)</sup> From the scale of magnification of his figures, and other internal evidence, it is possible to infer that the measurements of total length and thickness given by Rauther should all have the decimal point removed one place to the right.

3.3-4.2 mm. and 0.5-0.54 mm. respectively. (The specimens having been studied under coverglass pressure, the measurements of thickness are probably somewhat exaggerated). The cuticular striations are very coarse in the oesophageal region, and every second striation is somewhat more pronounced. The interval between them in the male is about 0.01 mm., in the female about 0.015 mm. There are no lateral alæ. The oesophagus (including the bulb) is 0.55-0.7 mm. long in the male and 0.85-0.9 mm. in the female. The

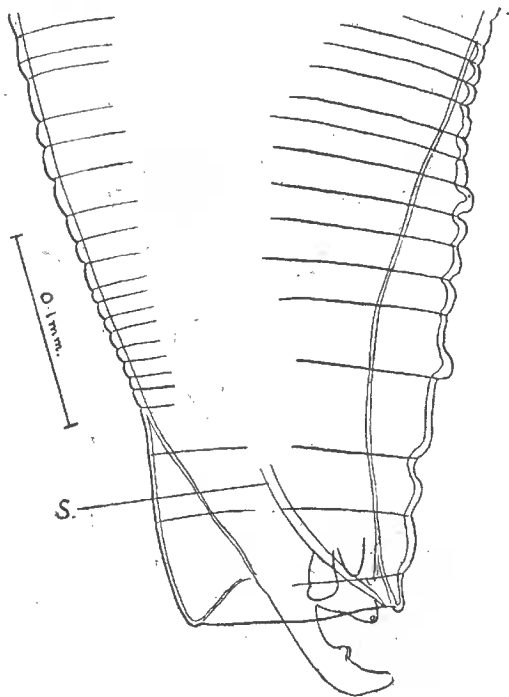


Fig. 7. — *Thelandros sahariensis*, from *Uromastix*, ♂ latéral, Cam. T. D. 2.

nerve-ring, in both sexes, is situated at 0.13-0.14 mm., and the excretory pore at 0.95-1.2 mm., from the anterior end. In the male the oesophageal bulb measures, on an average, about 0.18 mm. in diameter both longitudinally and transversely. In the female it measures 0.21-0.24 mm. in length and 0.23-0.25 mm. in width.

In the male the caudal end is without alæ, but is enveloped in a prepuce-like sheath, composed of an outer layer of cuticle which is widely separated, especially on the ventral side, from the inner layer covering the body proper. In this peculiarity especially the species very closely resembles *T. micruris* Rauther, and differs from *T. alatus*. There are two pairs of large adanal processes, each bearing a papilla, as in related species. The more dorsal of these processes on each side is somewhat rectangular when seen in lateral view. The posterior lip of the cloaca is produced into a broad process, which apparently bears a pair of small papillæ. The anterior

lip bears a fringe of delicate cuticular processes, as in *T. alatus*. The tail is produced into a ventrally-curved, finger-like process, bearing a very prominent pair of subventral papillæ at about its middle. The spicule is 0.075-0.092 mm. long.

In the female the tail measures 0.2-0.31 mm. in length, and is

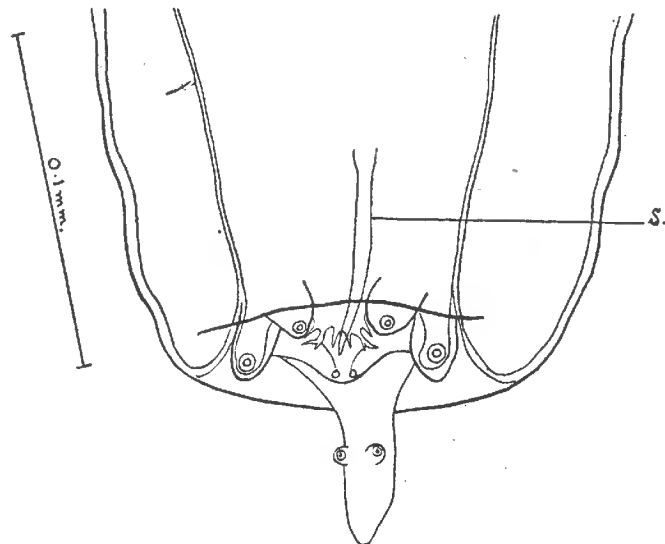


Fig. 8. — *Thelandros sahariensis*, ♂ ventral, from *Uromastix*. Cam. T. D. 4.

rather bluntly conical. The vulva is situated slightly behind the middle of the body (at 1.8-2 mm. from the posterior end). It has a very prominent and overhanging anterior lip. The eggs measure 0.133-0.14 mm.  $\times$  0.073-0.08 mm. Their shells exhibit a very fine radial striation which gives the surface a punctate appearance. Their contents are segmenting *in utero*.

#### TACHYGONETRIA VIVIPARA Wedl, 1862.

Many specimens of this species occurred, together with the last-described form, in the intestine of *Uromastix* sp. in the Hoggar region, 4. xi. 1927. A study of the material makes it possible to confirm Seurat's (1913) observation as to the existence, side by side, of viviparous and oviparous females, the latter being comparatively rare.

#### Subfam. **Cosmocerinæ.**

#### OXY SOMATIUM MACINTOSHII (Stewart, 1914).

Material which is assigned to this species was collected from the large intestine of *Bufo* sp. at two localities and on three occasions, viz. at Tamanrasset, Hoggar region, 6. xi. 1927, and at Bourem, in the Niger valley, 3. i. 1928 and 5. i. 1928.

*O. macintoshii* occurs in *Rana tigrina* and *Bufo melanostictus* in India and Burma. The present writer (1929) has somewhat doubtfully referred to this species some specimens (consisting of females only) from *Nectophrynoides vivipara* in East Africa. A full description of the species has been given by Karve (1927). The present specimens appear to belong to this species, or at least to a variety of it scarcely differing from the type. The only difference noted which may possibly be of some significance is in the position of the excretory pore. In the present material this lies considerably in front of the oesophageal bulb, while in Indian specimens it appears generally to be situated behind it. This difference, however, is probably to be accounted for partly by the fact that the « telescopic » neck is generally retracted in these specimens, so that the whole oesophagus is pushed backwards.

Fam. **SPIRURIDÆ.**

Subfam. **Spirurinæ.**

**SPIRURA TALPÆ** (Gmelin, 1790).

Several rather immature specimens of this species occurred in the stomach of *Erinaceus* sp. in the Hoggar region of the Sahara, 10. xi. 1927.

Subfam. **Physalopterinæ.**

**PHYSALOPTERA VARANI** Parona, 1889.

A few specimens, in rather poor condition, from the stomach of a chamæleon (Niger valley, between Lake Débo and Bamako, 14. ii. 1928.) are somewhat doubtfully referred to this species.

**PHYSALOPTERA** sp.

An immature female specimen from *Euxerus erythropus* at Niafunké, on the Niger below Lake Débo, 2. ii. 1928. The uterus has apparently four branches, and the species may possibly be *P. numidica* Seurat, 1917, the type host of which is a gerbil, *Dipodillus campestris*.

Subfam. **Thelaziinæ.**

**OXYSPIRURA** sp.

A single female specimen, « dans l'œil blessé de *Corvus* », Timétrine region, between the Hoggar and the Niger, 13. xii. 1927. *O. sygmoidea* (Molin, 1860) is recorded from *Corvus corone* and *C. frugilegus*, but the female is too inadequately described to enable the present specimen to be identified with it.

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- Fig. 1. — *Numidica monodi*. Anterior end of female; ventral view.
- Fig. 2. — *Numidica monodi*. Posterior end of male; lateral view.; *a. p.*, accessory piece; *l.*, left spicule; *r.*, right spicule; *s.*, sucker.
- Fig. 3. — *Numidica monodi*. Posterior end of male; ventral view.; *a. p.*, accessory piece; *l.*, left spicule; *r.*, right spicule.
- Fig. 4. — *Gendria tilapiae*. Anterior end of female; ventral view.; *c. p.*, cervical papilla; *e. p.*, excretory pore; *n. r.*, nerve-ring.
- Fig. 5. — *Gendria tilapiae*. Head of female; ventral view.; *d. t.*, dorsal tooth; *s. v. p.*, subventral papilla; *s. v. t.*, subventral tooth.
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